Ovarian Cycle and Menstrual Cycle

by Sophia

WHAT'S COVERED

In this lesson, you will learn to determine the components of the ovarian and menstrual cycles. Specifically, this lesson will cover:

1. The Menstrual Cycle & Hormones

The **menstrual cycle** is the cycle where oocytes are ovulated and the endometrium (inner lining) of the uterus prepares to receive a fertilized egg. One menstrual cycle is equal to about 28 days, on average. If the oocyte that is ovulated is not fertilized, the woman does not become pregnant, and the endometrium will break down and flow out through the vagina. The entire process will then begin again. The process of the endometrium flowing out through the vagina is called **menstruation**.

Menarche is a woman's first menstruation, usually shortly after puberty, and **menopause** marks the end of a woman's fertility. A woman will menstruate through her life until menopause occurs, then she is no longer able to conceive children, which marks the end of her fertility. Menopause typically occurs around the age of 50.

Progesterone and **estrogen** are the hormones that prepare the endometrium for pregnancy and are very important in driving the menstrual cycle.

TERMS TO KNOW

Menstrual Cycle
Monthly cycle in which an oocyte matures and is released from a woman's ovary.

Menstruation
The flow of the endometrium out the vagina if the oocyte was not fertilized during the menstrual cycle.

Menarche
A woman's first menstrual cycle.

Menopause
Marks the end of a woman's fertility in which a woman is no longer able to conceive.

Progesterone
A hormone released during the menstrual cycle that prepares the endometrium for implantation.

Estrogen

A female sex hormone that plays various roles in the female reproductive system, including preparing the endometrium for pregnancy.

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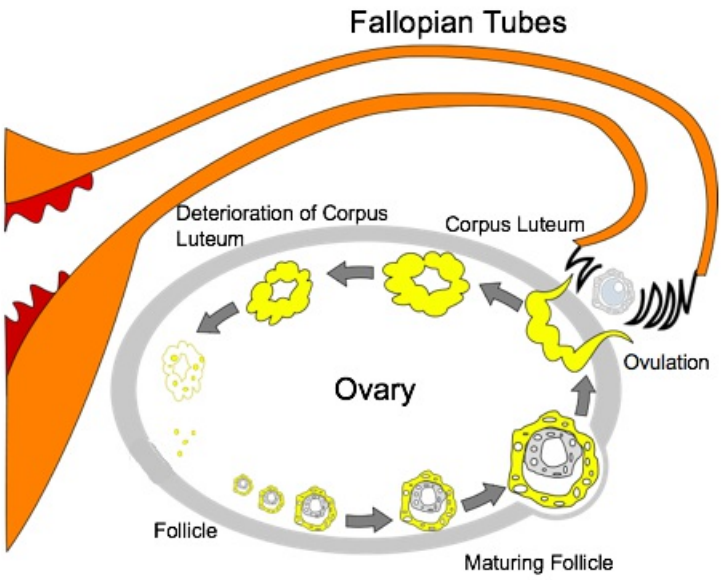
2. The Ovarian Cycle

As stated above, the menstrual cycle involves two simultaneous processes:

- The **ovarian cycle**: Maturation of an egg cell
- The uterine cycle: Preparation of the endometrium to receive and nourish the developing embryo

The ovarian cycle is where the oocyte (immature egg cell) will mature in the ovary and then be ovulated (released into the oviduct). This cycle begins with something called the **follicle**. The follicle is the oocyte surrounded by a layer of protective cells that provide nourishment for the oocyte. At this point, meiosis has started, but it is arrested or stopped.
As the follicle matures, the **zona pellucida** (a thick layer of protein) will begin forming around the maturing oocyte. Within the zona pellucida, a buildup of estrogen-rich fluids accumulates in preparation for ovulation.



During **ovulation** the egg (oocyte) will be released from its follicle within the ovary; the oocyte will travel through the oviduct (Fallopian tube). If the oocyte is going to be fertilized, it will occur as it travels through the oviduct. If the ovulated oocyte is fertilized, it will mature into an ovum within minutes, then become an embryo. If the oocyte does not become fertilized, it will not fully mature into an ovum.

The remnants of the ovulated oocyte's follicle remain in the ovary, where it forms the**corpus luteum**. This corpus luteum is going to secrete estrogen and progesterone, which help prepare the uterus for a fertilized egg. If the oocyte is not fertilized, this corpus luteum will start to break down, causing progesterone and estrogen levels to drop. The drop in estrogen and progesterone causes the arteries that supply the endometrium with blood to constrict. The vasoconstriction causes the breakdown and shedding of the endometrium, which is essentially the onset of menstruation.

TERMS TO KNOW

Ovarian Cycle

The cycle in which an oocyte matures as the menstrual cycle advances.

Follicle

The follicle consists of the maturing oocyte, along with surrounding cells that nourish the oocyte along its journey through the ovary.

Zona Pellucida

A protein-filled fluid that surrounds the follicle.

Ovulation

The process of expelling the oocyte from the ovary to the oviduct.

Corpus Luteum

When the oocyte is released into the oviduct, the cells that nourished it remain in the ovary; they supply the uterus progesterone and estrogen, preparing the uterine lining (the endometrium) for a fertilized embryo to implant and develop.

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3. Ovarian Cycle Hormones

Gonadotropin releasing hormone (GnRH) plays a role in the production and the release of follicle stimulating hormone. **Follicle stimulating hormone (FSH)** is an important part of the cycle because it stimulates the growth and maturation of a follicle. In turn, follicle stimulating hormone will also increase the expression of **luteinizing hormone (LH)** receptors, which is important for ovulation. Luteinizing hormone and follicle stimulating hormone have a permissive relationship; follicle stimulating hormone increases the expression of luteinizing hormone receptors. This makes sense: The follicle should be mature before it is ovulated, so only when FSH increases (and the follicle matured) are luteinizing hormone receptors (which initiate ovulation) expressed.

LH hormone, in addition to FSH, is released by the anterior lobe of your pituitary gland. FSH regulates the menstrual cycle and egg production. LH also plays a crucial role in the menstrual cycle and can be detected in the urine. If you're taking a fertility test, for example, it's testing for LH. As the egg gets closer to ovulation, there's a surge in LH levels that can be detected by at-home fertility tests.

TERMS TO KNOW

FSH

Follicle stimulating hormone; a major hormone of the reproductive system which stimulates ovulation.

LH

Luteinizing hormone; a hormone released from the anterior pituitary gland and plays a large role in the reproductive system.

SUMMARY

This lesson has been an overview of the processes that occur during the **ovarian** and **menstrual cycles** and the **hormones** significant to each cycle.

Keep up the learning and have a great day!

Source: THIS WORK IS ADAPTED FROM SOPHIA AUTHOR AMANDA SODERLIND

ATTRIBUTIONS

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FSH
Follicle stimulating hormone; a major hormone of the reproductive system which stimulates ovulation.

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The follicle consists of the maturing oocyte, along with surrounding cells that nourish the oocyte along its journey through the ovary.

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A protein layer that surrounds the follicle.